

## THE QUEST FOR NUCLEAR TECHNOLOGY AND THE CHALLENGES OF KNOWLEDGE MANAGEMENT IN NIGERIA

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**Abstract.** The major milestones in the quest for nuclear technology were highlighted, followed by a review of nuclear application in research and development, health, water resource management and agriculture. The past activities of the national INIS centre particularly with respect to submission of input, promotion and knowledge management were examined. And a repositioned INIS centre to meet the challenges of nuclear information management and the emerging trend in knowledge management was presented with specific target in the short and the long term.

### 1. INTRODUCTION

The setting up of the Federal Radiation panel in early sixties signified the awareness in Nigeria of the application and dangers of nuclear radiation. This initiative was further reinforced with the establishment of the Federal Radiation Protection Service in 1964, that same year Nigeria joined the IAEA thus opening a window for technical assistance in nuclear application for national development.

The enactment of the Nigeria Atomic Energy Commission Act in 1976, the launching of National Nuclear Programme and the designation of Obafemi Awolowo University and Ahmadu Bello University (ABU) Zaria as centers of excellence in nuclear research in 1977 marked the beginning of a systematic development of manpower and physical infrastructure for the peaceful application of nuclear science and technology in Nigeria.

Within the first ten years, the centers trained over 60 Nigerians up to PhD level in different areas of nuclear science and engineering in institutions in Europe and America. Now the pioneering scientists train Doctorate and Masters degree students locally at the centres.

Some major events in the last two years or thereabout have some far reaching implications to developments in the nuclear sector are;

- An Energy Policy that is explicit on nuclear energy development is in place
- A Regulatory agency the Nigerian Nuclear Regulatory Authority is now in place to monitor, regulate and ensure compliance
- Reactor Project at CERT Zaria and Compact LINAC at CERD Ife

The challenges and opportunities offered by these events call for urgent actions to step-up capacity building for the peaceful use of nuclear technology for national development.

### 2. Nuclear Application for National Development

Research, training and application of nuclear science and technology are carried out in our Federal, State and privately owned Universities in departments such as natural sciences, agriculture, medicine and Engineering

We also have specialized research institutes in areas of agriculture, health, water resources, petroleum and environment. In 2003, the center at ABU produced 8 MSc, 6 PhD thesis and published 15 research papers.

In the health sector we have over three thousand radiodiagnostic X-ray units and six radiotherapy centres in operation.

In the industry, there about 150 NDT services companies using iridium-192 and cobalt-60 gamma sources and over 35 well logging companies using americium-beryllium neutron source and cobalt-60 and caesium-137 gamma sources in the petroleum industry. Likewise

unknown number of companies in other sectors of the industry such as steel, textile, chemical and solid mineral exploration use some of form sources in their operations.

The country has also benefited from IAEA TC/AFRA projects and many other studies employing nuclear techniques for water resource management, environmental monitoring etc sponsored by International donor agencies.

*Table I. TC/AFRA Project by sectors (1977 – 2003)*

<b>Sector</b>	<b>Active</b>	<b>Completed</b>	<b>Total</b>
Agriculture	7	22	29
Health	8	11	19
Water Resources	3	2	5
Industry	3	15	18
Capacity Building	11	2	13
R & D	4	6	10
<b>Total</b>	<b>36</b>	<b>58</b>	<b>94</b>

### 3. Nuclear Information Management

A major challenge arising from this development, is the collection, harvest and disseminating of the widest possible information and knowledge accumulated over the last four decades.

Nuclear knowledge and information transfer is fundamental to capacity building and is required to support informed decision making on all issues surrounding the full life cycle of using nuclear and radiation technologies.

The resolution on nuclear knowledge by the IAEA General Conference in 2002 and 2003 and the recommendations and new guidelines by an INIS external evaluation panel, has given us the impetus to evaluate our activities and reposition the INIS center toward responding to this challenge and the emerging trend in knowledge management.

In doing so we refocus our mind on two key areas of INIS operation in our Centre;

#### *3.1. Collection of relevant material and preparation of input*

Our membership obliged us to make contribution commensurate with the level of activities within our borders. INIS has developed over the years as the World's leading information system in nuclear science and technology through the coordination of IAEA and the cooperation of member states.

*Table II. Input by Nigeria to INIS Database (1999 – 2003)*

<b>Year</b>	<b>Input by Nigeria</b>	<b>Total input to INIS</b>	<b>% Contribution by Nigeria</b>
1999	28	61227	0.0457
2000	22	65719	0.0334
2001	64	69391	0.0922
2002	8	71276	0.0112
2003	14	87837	0.0159

### 3.1.1. Data Collection

Thus far we have identified a number of institutions and professional associations whose literature output is of relevance to INIS as summarized in Table III.

*Table III. Summary of data collection programme*

Identified	Contacted	Made Request	Responded	Material Retrieved	
Institutions	86	25	23	3	50 abstracts
Professional Associations	6	4	3	2	300 abstracts

### 3.1.2. Input Preparation

We use the INIS-CBT with other INIS reference materials to provide us with a guide to input preparation

- (1) We had one-week interactive Workshop on INIS-CBT from which
  - 60 articles from a conference proceedings and a book of Abstracts were considered
  - 40 abstract were selected
  - 25 input were submitted
- (2) Materials from the Nigerian Association of Petroleum Explorationist
  - 267 Abstracts from conference proceedings and a book of Abstracts were selected
  - In addition to 6 abstracts of video presentations

## 3.2. Promotional Activities

### 3.2.1. Development of Promotional Materials

Promotional materials are being developed to address the various interests within the scope of INIS. The objective is to create awareness among our scientists and engineers, of the resources within INIS and how they can access it and use it in their work and make contribution to its development.

— Information flyers on INIS incorporating a survey instrument were developed for distribution to participants at seminars, workshop and conferences with some relevance to the subject scope of INIS.

— INIS user survey covering larger percentage of academic departments in the universities such as physics, chemistry, biological sciences, medicine, agriculture etc has been instituted to bring the staff and students into INIS fold. The objective of the survey are to determine the level of awareness and usage of INIS database among Nigerian scientists,

— Avenues to cover renewable energy activities in the country are under consideration through the development and publication of a Newsletter, focussing on the objectives of INIS. We have initiated discussion with three renewable energy research centres on this project.

— We are looking at options offered by the Nigerian Universities Network (NUNet) to deliver INIS products and services to Nigerian Universities on the network.

— A paper on nuclear knowledge preservation initiative, has been accepted for presentation at the Nigerian Institute of Physics annual national conference, scheduled for september, 2004.

## 4. Knowledge Management

### 4.1. Nigerian Energy laws and legislations.

The Energy Commission of Nigeria has retrieved about 90% of laws and legislations guiding the energy sector. We are proposing the documentation and rendering these to magnetic media for easy access to the public.

#### 4.2. *Environmental Impact Assessment Report of Energy Related Project*

A lot of resources were committed to carry out these studies to give an inventory of the environment in which a project is sited. The reports contains parameters that will guide further studies, of particular interest are the;

- The soil fertility mapping project to be executed using facilities of MNSR at CERT Zaria

- Articulations of measures to address communal issues at the oil producing communities

#### 4.3. *Documentation of TC/AFRA Projects carried out in the country*

Nigeria has benefitted from TC projects in areas such as agriculture, medicine, water resources etc. There is need to document such studies for;

- Case studies for scientists working on similar subjects

- Demonstration of nuclear techniques in addressing some fundamental issues in our day to day activities such as

- Improved crop and livestock production

- Improved health care delivery

- Provision of portable water etc

### 5. Challenges

#### 5.1. *Personnel*

There are 4 staff working with INIS with no previous knowledge of INIS activities, prior to their deployment. There is need to step up skill acquisition in all aspect of INIS operations.

#### 5.2. *ICT*

- We have one dedicated computer and two others sharing with other task of Energy Commission

- One hp scanjet 7450 imaging scanner

- Limited access to internet through our commission's single dial-up connection.

#### 5.3. *Funding*

Funding is required in all of our activities. Other opportunities we are considering include;

- Partnering/Networking to share financial burden by stakeholders and the development of products and services that can attract funding from such institutions as Petroleum Technology Development Fund and Education Tax Fund.

- Sustainability through the development and sales of INIS marketable products and services.

### 6. The Way Forward

#### 6.1. *short term*

In the short term we shall concentrate on equipping the centre with basic infrastructure and the acquisition of skills required for effective running of an INIS centre.

Targets we hope to achieve within this horizon, 2004 – 2005;

- Contribute 0.5-1.0% of the total input to INIS as against 0.0159% in 2003

- Reach out to 5000 potentials users.

*6.2 long term perspective*

- Develop an information resource to meet the needs of our scientists and engineers working on nuclear science and related fields.
- Provide a platform to pool, analyse and share nuclear knowledge and experience at national level, address preservation and promotion of knowledge, maintain competence and avoid duplication wherever necessary.
- Facilitates the attainment of National Development goals through promotion of peaceful application of nuclear science

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